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FOREST PEST MANAGEMENT
Pacific Southwest Region

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AN EVALUATION OF A MODOC BUDWORM OUTBREAK ON THE MODOC NATIONAL FOREST

PSW FOREST AND RANGE EXPERIMENT STATION
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ABSTRACT

The Warner, Manzanita and Happy Camp Mountain areas of the Modoc National Forest were surveyed for the occurrence of the Modoc budworm. This budworm was not found in the Happy Camp Mountain area. It was only found at very light levels at Manzanita Mountain, and very light to moderate levels in five areas of the Warner Mountains. In total, about 50,000 acres of white fir at the higher elevations are affected. Very light to moderate levels of defoliation are predicted for 1985.

INTRODUCTION

An evaluation of a Modoc budworm outbreak on the Modoc National Forest was made during the week of August 24. The purpose of this evaluation was to locate areas of outbreak, determine relative population levels for 1984, and predict the outlook for 1985.

The current outbreak is the third in this area since the 1940's (California Forest Pest Control Action Council, 1949-1983, Conditions Reports). The previous outbreaks, 1959-1963 and 1973-1975, collapsed within 3 to 5 years of their inception. In the earlier outbreaks, damage to the trees in the infested stands was relatively minor.

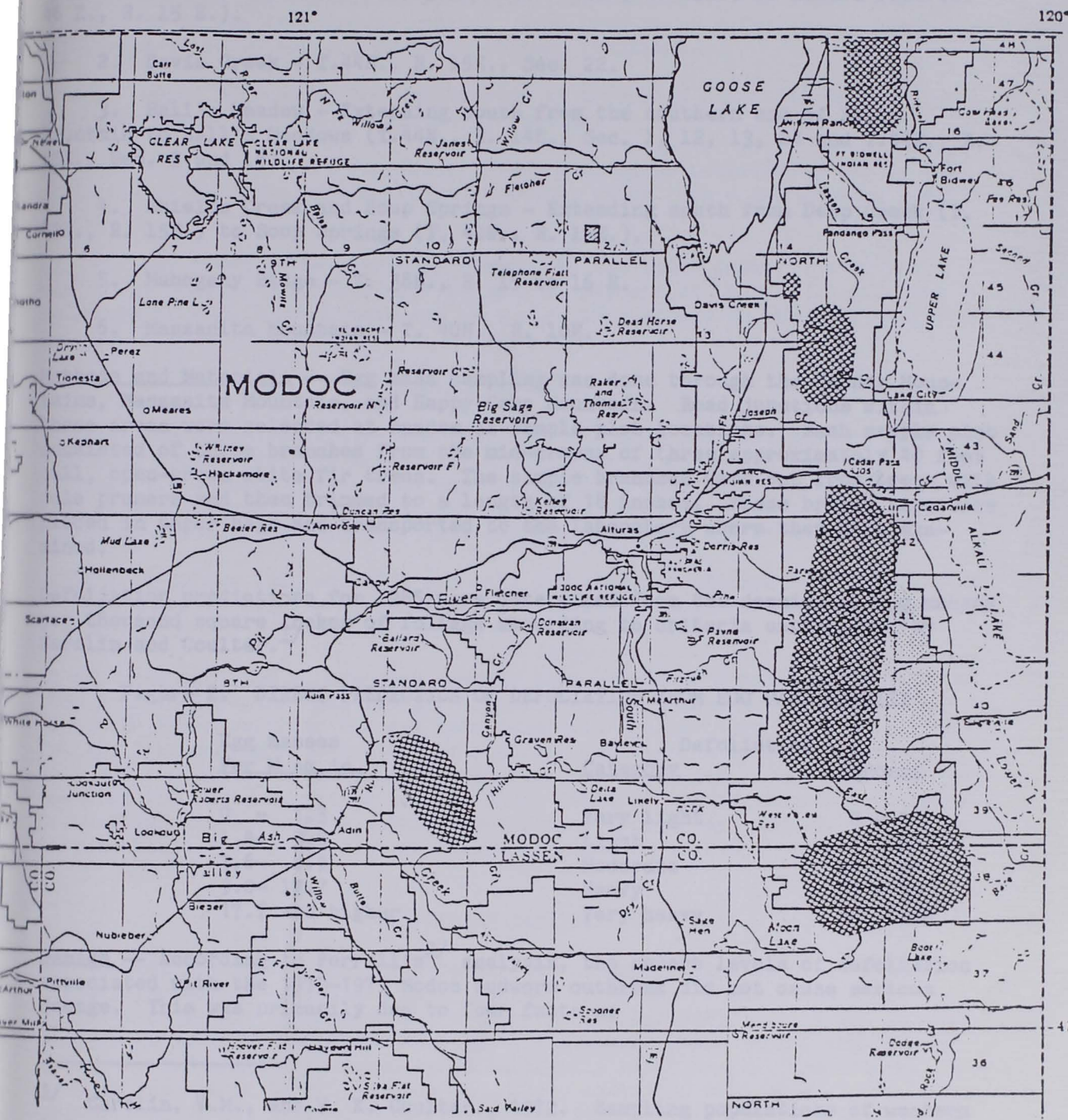
TECHNICAL INFORMATION

Causal Agent -- Modoc budworm, Choristoneura retiniana (Wlsm)

Host Trees Attacked -- White fir, Abies concolor

Location of Outbreaks -- Six areas of outbreak were observed (Figure 1):

MODOC NATIONAL FOREST



Scale 5 10 15 20 miles

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NATIONAL FOREST BOUNDARY

Defoliation

AREA DEFOLIATED

BY

BUDWORMS - 1984

MODOC NATIONAL FOREST

1. Lilly Lake and Mill Creek - Extending south from the California - Oregon border near Cave and Lilly Lakes (T. 48N., R. 15E.) to Howard Flat (T. 46 E., R. 15 E.).

2. Davis Creek - T.44E., R. 15E., Sec. 22.

3. Hall's Meadow - Extending south from the southern end of Bucks Mountain to Hall's Meadows (T.44N., R. 14E., Sec. 1, 12, 13, 24 and T.44N., R. 15E., Sec. 9 and 16).

4. Shields Creek and Soup Springs - Extending south from Deep Creek (T. 42N., R. 15E.) to Soup Springs (T. 40N., R. 15E.).

5. Mahogany Ridge - T. 38N., R. 15 to 16 E.

6. Manzanita Mountain - T. 40N., R. 10E.

Methods and Materials -- Egg mass sampling was done through the Warner Mountains, Manzanita Mountain, and Happy Camp Mountain. Road junctions within these areas were selected at random as sample plot locations. Each sample plot consisted of three branches from the mid-crowns of three approximately 40 foot tall, open-grown white fir trees. The sample branches were cut from trees with pole pruners and then trimmed to a length of 18 inches. These branch tips were placed in paper bags and transported to the laboratory where they were examined.

Defoliation predictions for 1985 were determined from the density of egg masses per thousand square inches of foliage according to criteria established by Carolin and Coulter.[1/]

Figure 2. DIRECT PREDICTION OF DEFOLIATION FROM EGG MASS DENSITY

Egg masses Per M sq.in.	Defoliation Category	Percent
0 - 1.3	Very light	0 - 15
1.4- 3.5	Light	16 - 25
3.6- 8.9	Moderate	26 - 50
9.0- 17.7	Heavy	51 - 90
17.7 and higher	Very heavy	91 - 100

Damage -- According to Ferrell's[2/] analysis, the severe levels of defoliation associated with the 1973-1975 Modoc budworm outbreak did not cause serious damage. This was primarily due to four factors:

1/ Carolin, V.M., and W. K. Coulter., 1972. Sampling populations of western budworm and predicting defoliation in eastern Oregon. USDA Forest Service, Pacific Northwest Forest and Range Experiment Station, Res. Pap. PNW-149, 33 p.

2/ Ferrell G.T. 1980. Growth of white fir defoliated by Modoc budworm in northeastern California. USDA Forest Service, Pacific Southwest Forest and Range Experiment Station Res. Pap. PSW-153, 9p.

1. Because new foliage is preferred, defoliation by the Modoc budworm leaves much of the tree crowns intact. Even with heavy defoliation, trees still have 50 to 75 percent of their foliage remaining.

2. Trees respond to the defoliation by producing adventitious buds and shoots to compensate for the destroyed foliage.

3. Much of the adverse affect of top killing is compensated for by the upturning of branches of the uppermost whorl, which form a new growing top for the trees.

4. For trees to be seriously damaged by the Modoc budworm, they would have to be heavily defoliated for periods of 5 years at least. To date the outbreaks of this budworm have not persisted long enough to cause serious tree damage.

RESULTS AND DISCUSSION

In 1984, the Modoc budworm caused very light to moderate levels of defoliation over some 50,000 acres of white fir in six areas of the Modoc National Forest (Figure 1). Results of egg mass surveys indicate that the outbreak will persist into 1985, but defoliation will remain at about the 1984 levels. This degree of defoliation will not cause serious damage in the affected stands.

Table 1 lists the 1983 and 1984 egg mass densities, predicted 1985 defoliation and the observed density of 1984 parasite cases for each of the 22 sample plots.

No egg mass plot had an egg mass density high enough to predict heavy defoliation in 1985 (greater than 9.0 per thousand square inches of foliage). Only 7 of the 22 egg mass plots had egg mass densities greater than 3.6/M sq.in. of foliage, indicating a potential for moderate defoliation in 1985. Eleven, or half, of the plots had very light densities of egg masses. Fifteen, or 68 percent, of the plots had light to very light densities of egg masses. Parasite populations are developing within two-thirds of the areas sampled. This should help to limit the extent of the budworm populations in 1985.

MANAGEMENT IMPLICATIONS

The current population and predicted levels of defoliation as well as the history and damage associated with previous outbreaks of the Modoc budworm suggest the No Action alternative is appropriate for 1985. While the population is expected to persist into 1985, the numbers remain relatively low and attendant defoliation is expected to be light. Additionally, the natural enemy complex appears to be on the rise and, given that 1985 will be at least the second year of the current outbreak, the existing low-density populations may be near collapse. This, coupled with the fact that the very heavy defoliation which occurred in the previous outbreaks caused only minor damage, further reinforces the adoption of the No Action alternative for 1985. Continued monitoring of the Modoc budworm situation is appropriate and FPM will assist with the effort in 1985.